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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/734,077

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David Akopian

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EXAMINER

HUANG, DAVID S

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/734,077

Applicant(s)

AKOPIAN, DAVID

Examiner

DAVID HUANG

Art Unit

2611

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 9-17 is/are rejected.
- 7) ☒ Claim(s) 5-8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/5508)
- Paper No(s)/Mail Date 7/26/2004, 4/22/2005
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The references listed in the Information Disclosure Statement(s) filed on 7/26/2004 and 4/22/2005 have been considered by the examiner (see attached PTO-1449 form or PTO/SB/08A and 08B forms).
2. Reference by P. Duhamel and M. Vetterli listed in IDS filed on 7/26/2004 has not been considered since a copy of the document has not been submitted.

Specification

3. The disclosure is objected to because of the following informalities: Page 16, line 11, "Thus, it is no necessary..." should be "Thus, it is **not** necessary".

Appropriate correction is required.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 17 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Computer programs claimed as computer listings per se, i.e., the description or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a "computer-readable medium encoded with a computer

program" is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-842 32 USPQ2d at 1035.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. **Claims 1, 2, 4, 10, 12-15 and 17** rejected under 35 U.S.C. 102(e) as being anticipated by Yotsumoto et al. (US 2004/0042388).

Regarding **claims 1, 14 and 15**, Yotsumoto et al. disclose a system for determining in the frequency domain the correlation between a code modulated signal and a replica code sequence in parallel for various relative shifts between said code modulated signal and said replica code sequence (page 1, [0014]; Figs. 7 and 8), said system comprising:

a receiver with a receiving component for receiving a code modulated signal from a beacon and with a transmitting component for providing samples of said code modulated signal (reception unit 20, with reception circuit 200 and A/D 202, Fig. 7; page 2, [0034]; page 4, [0101]-[0103]);

a device with a receiving component for receiving samples of a code modulated signal provided by said receiver (delay profile detection unit 22, Fig. 7 and hardware construction in

DSP circuit 26, Fig. 8) and a common memory (RAM 266, Fig. 8) arranged for storing in sequence intermediate results in determining said correlation, said intermediate results including at least samples resulting at various stages of a time to frequency transform used for transforming samples of said code modulated signal into the frequency domain and samples resulting at various stages of a frequency to time transform used for transforming obtained correlation results into the time domain (FFT Unit, page 4, [0110]-page 5, [0123]; multiplication unit 220, Fig. 7, page 6, [0152]-[0154]; IFFT Unit page 6, [0155]-[0166]; multiple butterfly operations with results stored in RAM 266).

Regarding **claim 2**, Yotsumoto et al. disclose everything claimed as applied to claim 1, and further disclose wherein said memory is further arranged for storing samples of said code modulated signal before storing said intermediate results (RAM 266 stores data from A/D 202, page 4, [0115]-[0116]; FFT stores results of first-stage butterfly operation in RAM 266, page 5, [0120]-[0123]).

Regarding **claim 4**, Yotsumoto et al. disclose everything claimed as applied to claim 1, and further disclose said time to frequency transform is a Fast Fourier Transform and wherein said frequency to time transform is an Inverse Fast Fourier Transform (page 1, [0012]-[0015], Fig. 7).

Regarding **claim 10**, Yotsumoto et al. disclose everything claimed as applied to claim 1, and further disclose said device is a receiver comprising in addition a receiving component for receiving a code modulated signal from a beacon (reception unit 20, with reception circuit 200 and A/D 202, Fig. 7; page 2, [0034]; page 4, [0101]-[0103]) and a replica generator for generating said replica code sequence (page 6, [0149]-[0151]; code generation unit 24, Fig. 7).

Regarding **claim 12**, Yotsumoto et al. disclose everything claimed as applied to claim 1, and further disclose a receiving component for receiving samples of said code modulated signal from a receiver receiving said code modulated signal from a beacon (reception unit 20, with reception circuit 200 and A/D 202, Fig. 7; page 2, [0034]; page 4, [0101]-[0103]) and a replica generator for generating said replica code sequence (page 6, [0149]-[0151]; code generation unit 24, Fig. 7).

Regarding **claim 13**, Yotsumoto et al. disclose everything claimed as applied to claim 12, and further disclose said device is a network element of a communication network (base station, page 4, [0090]-[0091]; see Figs. 1, 7 and 8).

Regarding **claim 17**, Yotsumoto et al. disclose a software program product in which a software code is stored for determining in the frequency domain the correlation between a code modulated signal and a replica code sequence in parallel for various relative shifts between said code modulated signal and said replica code sequence, said software code realizing the following steps when running in a processing unit (page 4, [0094]-[0098]):

a) applying a time to frequency transform on samples of said code modulated signal for transforming said samples of said code modulated signal into the frequency domain, and storing intermediate results resulting at various stages of said time to frequency transform in a memory (pages 7-8, [0197]-[0198], Fig. 7 and 8; RAM 266); and

b) applying a frequency to time transform on obtained correlation results for transforming said obtained correlation results into the time domain, and storing intermediate results resulting at various stages of said frequency to time transform in said same memory (pages 7-8, [0197]-[0198], Fig. 7 and 8; RAM 266).

(see also rejection of claims 1, 14 and 15 above)

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 3, 9 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yotsumoto et al. (US 2004/0042388).

Regarding **claims 3 and 16**, Yotsumoto et al. disclose everything claimed as applied to claim 1, and further disclose a multiplier for multiplying (Multiplication Unit 220, page 6, [0153]-[0154], Fig. 7) reordered time to frequency transformed samples of a replica code sequence (for FFT #1, results of the third stage butterfly different order from first and second stage page 5, [0134]; order of arrangement of FFT result A and B from FFT units #1 and #2 are the same, page 6, [0150],[0151], [0159]-[0160]; this it is inherent that the frequency transformed samples are "reordered" or rearranged) to said time to frequency transformed samples of said code modulated signal in order to obtain said correlation results (page 6, [0153]-[0154], Fig. 7).

However, Yotsumoto et al. fail to expressly disclose one of a reordered conjugate of time to frequency transformed samples of said replica code sequence and reordered time to frequency transformed samples of an inverted replica code sequence

Nevertheless, Yotsumoto et al. disclose a general FFT-processing which includes an initial bit reverse step (Fig. 2).

Therefore, it would have been an obvious matter of design choice to apply the general FFT processing technique disclosed by Yotsumoto et al. since applicant has not disclosed that inverting the code sequence solves any stated problem or is for any particular purpose, and it appears that the invention would perform equally well with either an inverted or non-inverted code sequence.

Regarding **claim 9**, Yotsumoto et al. disclose everything claimed as applied to claim 1, but fail to expressly disclose said device is a matched filter.

Nevertheless, Yotsumoto et al. teach a W-CDMA mobile communication system conventionally employs a matched filter in performing inverse-spread processing (correlation detection processing) on a spread-processed signal (page 2, [0034]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify the device to be a matched filter, since matched filters are conventionally used in inverse-spread processing.

9. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yotsumoto et al. (US 2004/0042388) in view of Forrester (US 2003/0134646).

Regarding **claim 11**, Yotsumoto et al. disclose everything claimed as applied to claim 1, but fail to expressly disclose wherein said device is a mobile terminal including a receiver receiving said code modulated signals from a beacon.

Nevertheless, the teaching of Yotsumoto et al. has the benefit of enabling software inverse-spread processing and reduces the operation amount and time necessary for the inverse-spread processing (page 2, [0042]-[0043]).

Forrester discloses mobile device 102 (Fig. 1) includes a GPS receiver which receives position information from GPS satellites 104 (page 2, [0017]). GPS capability is commonly incorporated into wireless communication devices, such as cellular type handsets. However, limited resources of these mobile devices is a known problem (page 1, [0005]-[0006]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the Inverse-spread processing using FFT of Yotsumoto et al. as a mobile device since Forrester teaches that GPS capability in mobile devices is well known in the art. Furthermore, these teachings are complementary since the reduced operation amount and reduced time necessary for inverse-spread processing taught by Yotsumoto et al. help to address the well known problem of limited processing power in mobile devices.

Allowable Subject Matter

10. **Claims 5-8** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: The present invention comprises a device for determining in the frequency domain the correlation between a code modulated signal and a replica code sequence in parallel, the device comprising a common memory for storing intermediate results including at samples resulting at various stages of a time to frequency transform and frequency to time transform. The closest prior art, Yotsumoto et al. (US 2004/0042388), teaches a similar system that performs correlation in the frequency domain and has a common memory (RAM 266) that stores intermediate results like the claimed invention. However, Yotsumoto et al. fail to disclose the specific structure of

the device including a first multiplier, a second multiplier, a processing element, and an index generator, all arranged in a loop to perform iterative butterfly operations. These limitations distinguish claims 5-8 over the prior art.

Citation of Pertinent Prior Art

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yeh (US 2004/0059766) teaches a pipelined low complexity FFT/IFFT processor that uses a single memory buffer while simultaneously supporting and reordering a continuous stream of output. (page 7, [0078]).

Jaber (US 2003/0041080) discloses a prior art FFT architecture with a shared memory (Fig. 5).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID HUANG whose telephone number is (571)270-1798. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSH/dsh

April 22, 2008

/David Huang/

Examiner, Art Unit 2611

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611